

Typhoon Gordon developed rapidly from a disturbance which was initially detected while it was embedded in an elongated monsoon trough along 8N between 145E and 175E. Within 48 hours of its initial detection, Gordon reached typhoon strength and eventually proved to be one of the most difficult typhoons of the season for JTWC forecasters.

On 25 August, a surface circulation was detected near 8N 163E associated with an area of strong, yet unorganized convection. During the ensuing 24 hours little increase in convective organization was noted on satellite imagery; however, an upper-tropospheric pattern existed nearby that was conducive for further development. Analysis data indicated that outflow channels were readily available via an upper-level anticyclone centered near 10N 167E, further enhanced by a tropical upper-tropospheric trough (TUTT) north of Guam.

Rapid development did not occur until the upper-level anticyclone moved over the surface circulation. A TUTT cell located northwest of the disturbance enabled outflow channels to remain open to all quadrants and resulted in a significant increase in convection on 26 August. A Tropical Cyclone Formation Alert (TCFA) was issued at 261500Z during this burst in convective activity and organization. Synoptic data from Truk Atoll (WMO 91334) and Ponape (WMO 91348) at 261200Z also indicated intensification was occurring as gradient level winds increased to near 30 kt (15 m/sec) at both reporting stations.

A reconnaissance aircraft investigative mission at 262347Z was able to fix a circulation center near 14.5N 154E with associated surface winds of 30 kt (15 m/sec) and a 1001 mb sea level pressure. These data preceded the issuance of the first warning for Tropical Depression 16 at 270100Z. One day later, at 272335Z, reconnaissance aircraft data showed Gordon's central sea level pressure had dropped to

977 mb and surface winds of 65 kt (33 m/sec) were observed in the north semicircle. During this period of intensification, Gordon was upgraded to tropical storm status at 270600Z and typhoon status at 280000Z based on reported aircraft data and steadily increasing cloud system organization. At 291800Z, four days after initial detection, Gordon's rapid intensification ended at 100 kt (51 m/sec) (See Figure 3-16-1).

The forecasts issued by JTWC during Gordon's developing stages anticipated a northwestward movement toward a weakness in the subtropical ridge located near 20N 150E. These forecasts anticipated recurvature to occur as Gordon moved north of the ridge axis along 23N and came under the influence of an advancing mid-latitude trough. In response to this synoptic situation, Gordon's forward speed slowed as it approached the ridge axis on 28 August; however, the mid-latitude trough continued its eastward movement and by 29 August, its effects on Gordon's movement were no longer evident. Following the passage of this trough, the subtropical ridge was re-established north of Gordon and in response, Gordon resumed a northwestward track along the ridge's southwestern periphery. Forecasts issued on 29 and 30 August reflected Gordon's continued northwestward movement followed by a northward movement and acceleration toward Japan.

By 31 August, a different forecast scenario was gaining strength. At 310000Z, 500 mb and 700 mb height rises were observed over southern Honshu and north of Gordon, indicating the approaching short wave trough was weakening or moving more northeastward than previously forecast. During this period, Gordon, with 90 kt (46 m/sec) surface winds, was advecting large amounts of warm, moist air from the tropics and thereby strengthening the ridge to the northeast. This strengthening of the ridge, combined with changes in the short wave trough, forced Gordon toward

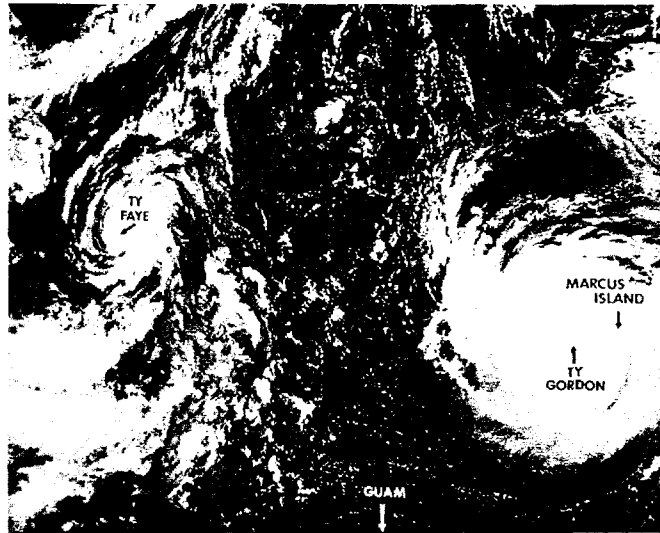


Figure 3-16-1. Typhoon Gordon near maximum intensity of 100 kt [51 m/sec] 640 nm [1185 km] northeast of Guam. Typhoon Faye is also seen in this picture south of Okinawa. 290502Z August (NOAA 7 visual imagery).

a more westward track which was maintained until late on 2 September.

In response to numerical forecast fields which showed a low- to mid-level ridge near Korea building eastward over Japan, JTWC forecasts on 2 September began forecasting a continued westward movement along the southern periphery of the two ridges. By 030000Z, a conflicting forecast scenario began to develop. It was observed that 500 mb and 700 mb heights were falling over southern Honshu, indicating that the short wave trough, located over Hokkaido, was deepening once again. However, the numerical forecast fields provided by Fleet Numerical Oceanography Command (FNOC), Monterey, CA, did not reflect this tendency and continued to build the ridge behind the short wave trough and to the north of Gordon's track. At this time, two opposing forecasts were considered possible: one reflecting the westward track below the

ridge; the other, indicating a sharp recurvature and acceleration toward the northeast in response to the deepening trough. JTWC chose to maintain the westward prediction as the FNOC forecast fields appeared to be a meteorologically sound solution to the synoptic situation. Concurrently, an intensive meteorological watch was instituted whereby conventional analysis data and satellite imagery were closely monitored for indication of any changes which would mandate a change from the westward-moving forecast scenario.

On 3 September, Gordon slowed to 4 kt (7 km/hr) from 7 kt (13 km/hr) and took an increasingly more northward course. This movement, combined with the continued 500 mb and 700 mb height falls over Honshu prompted JTWC to abandon the westward forecast at 031200Z, and adopt a forecast toward sharp recurvature and acceleration to the northeast.

Subsequent to the change in the JTWC forecast toward recurvature, the FNOG forecast fields, produced from the 031200Z data base, changed significantly and supported the recurvature scenario. Had the numerical forecast series indicated this trend earlier and not persisted in building the low- to mid-level ridge eastward from Korea, the recurvature track would have been adopted much earlier or perhaps not even abandoned on 2 September. This forecast situation emphasizes the difficulty in issuing credible forecasts when there exists a conflict between the observed short-term changes in the analysis data and the numerically forecast changes beyond the analysis period. There are no easy answers in these situations and unfortunately, in similar future forecast situations, JTWC and its customers may well have to deal with alternating guidance from both analysis and forecast fields.

On 3 and 4 September, Gordon did sharply recurve to the east-northeast as it became embedded in the mid-latitude westerlies along the southeastern periphery of the short wave trough. A fairly rapid acceleration to 22 kt (41 km/hr) was observed prior to extratropical transition near 37N at 050600Z. As Gordon recurved, it passed 260 nm (482 km) southeast of Tokyo. The U.S. Naval Oceanography Command Facility at Yokosuka, Japan, reported maximum sustained winds of 32 kt (16 m/sec) with a maximum gust of 44 kt (23 m/sec) during the period, 3 to 4 September. Fortunately, despite some difficult forecast situations, Gordon did not strike any major land mass and there was no significant damage to military or civilian interests in Japan.